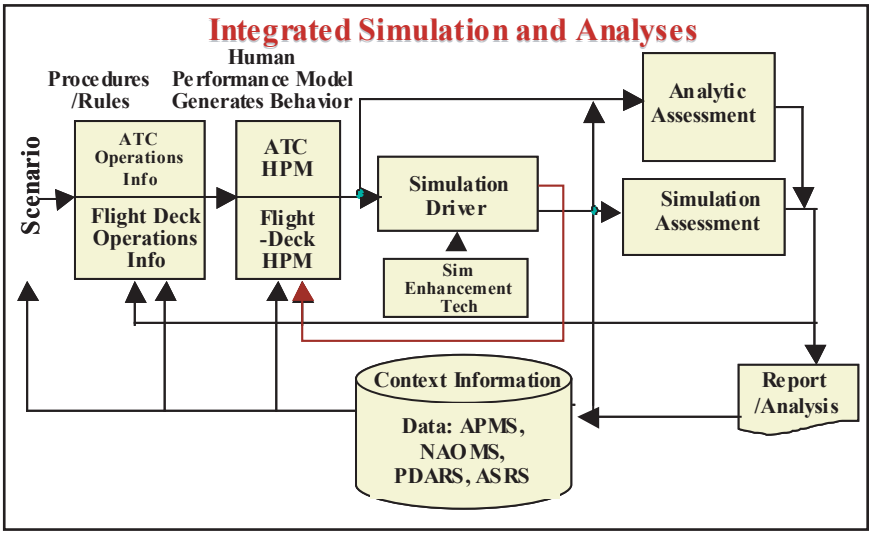
Human Factors

research and technology division

Modeling and Fast-time Simulations (M&S)

Objective

Modeling & Simulations is an element of the ASMM Project to provide technology and procedure developers with reliable predictions of the system-wide effects of the changes they are introducing into the NAS.



Approach

The M&S element will establish consistent and predictable relationships among elements of the NAS with emphasis on incorporating appropriate human-behavioral models. This serves as a computational test bed for simulating and analyzing system performance, including the contributions of individual operators, individual elements of the system, technologies and large-scale system flow and control issues. Fast-time simulations will be used to support safety-risk assessment, identify performance metrics, and focus requirements for the more expensive human-in-the-loop simulations.

Impact

A major milestone was accomplished recently that :

- Demonstrated full dynamic linkage of SJSUís Air MIDAS with HLA federate messaging among controllers and pilots, GaTechís RFS, ATACís SIMMOD, and ATACís aggregate output statistics.
- Used a Clear-Air-Turbulence-encounter scenario
- Air traffic and air-ground communications in a high-altitude en-route sector
- Up to 12 aircraft in 2 sectors.
- Flight crews, air traffic controllers, and their interactions are modeled with the Air MIDAS human-performance model.
- Other agents include aircraft, sensors, radar, and communication channels.

Research Question: How would workloads and traffic patterns be impacted by timing of on-board CAT warnings?

Demonstrated potential for a system-wide perspective on risk assessment.

Information Technology

M&S incorporates the most advanced tools for modeling human performance and for merging these with innovative technology for efficient fast-time Monte Carlo simulations and with automated tools for assessing safety risks from a system-wide perspective.

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URL: http://humanfactors.arc.nasa.gov/ihs/